

**REMARKS**

Claims 1-12 have been canceled without prejudice.

Claim 13 has been amended. Support is found in the specification at, for example, page 3, line 24 to page 4, line 7, page 4, line 18 to page 5, second line from the last, page 14, lines 8-10, page 15, line 1, page 20, line 1 to page 25, line 25; and original claims 2, 3, 4, 12, and 13. See *In re Gardner*, 177 USPQ 396, 397 (CCPA 1973); and MPEP §§ 608.01(o) and (l).

Claim 14 was previously canceled without prejudice.

Withdrawn claims 15-25 have been canceled without prejudice.

Claims 26-32 have been added. Support for claim 26 is found in the specification at, for example, page 5, second line from the last to page 6, line 13; and original claim 5. (Id.)

Support for claim 27 is found in the specification at, for example, page 5, line 19, and page 6, line 14; and original claim 6. (Id.)

Support for claim 28 is found in the specification at, for example, page 5, lines 14-19 and page 14, lines 15-17; and original claim 7. (Id.)

Support for claim 29 is found in the specification at, for example, page 5, lines 14-24, and page 6, lines 14-17; and original claim 8. (Id.)

Support for claim 30 is found in the specification at, for example, page 5, lines 14-24, page 6, lines 14-17, and page 14, lines 15-23; and original claim 9. (Id.)

Support for claim 31 is found in the specification at, for example, page 15, line 30; and original claim 10. (Id.)

Support for claim 32 is found in the specification at, for example, page 15, line 31 to page 16, line 2; and original claim 11. (Id.)

No new matter has been added.

***Anticipation Rejections***

A. Spange

Claims 1-12 were rejected under 35 U.S.C. § 102(b) as anticipated by Spange et al., *Angew. Chem. Int. Ed.* 2002, 41, 10, 1729-1732 ("Spange"). (Paper No. 20100203 at 2.)

Spange discloses a one-pot synthesis of chromophoric silicate-based xerogels using a sol gel process. (Title; Page 1729, left column, first full paragraph.) Spange also discloses use of xerogels in applications such as "nonlinear-optical (NLO) materials, semiconductors, or for use in sensors." (Page 1729, lines 7-8.)

In making the rejection regarding claims 1-3, and 12, the Examiner asserted that "Spange et al. discloses a method of encapsulating chromophores wherein the encapsulated components show improved retention within the microcapsule due to a new sol-gel procedure (pg. 1729, left column, second paragraph). The first step of the encapsulation procedure involves the covalent modification of a trialkoxysilane with an organic (e.g. chromophoric) group (reads on the crosslinkable chromophore monomer of the instant invention) (pg. 1729, left column, second paragraph) in the absence of non-crosslinkable [chromophores]. More specifically, a fluorine atom in a chromophoric substance (e.g. fluorobenzophenone, a UV-A absorber) (pg. 1729, right column, first paragraph; Table 1) is substituted by a primary or secondary amine bonded to an alkoxy silane in tetraethoxysilane (TEOS)

(e.g. aminopropyltrimethoxysilane, APS). This functionalized trialkoxysilane is converted into an organically modified silica gel (i.e. sol-gel hybrid; page 1729, Scheme 1) by addition of tetraalkoxysilane (reads on the crosslinkable monomer of the instant invention) (pg. 1729, left column, third paragraph)." (Id. at 2-3.)

With regard to claims 4, 6, and 7, the Examiner asserted that "Spange et al. discloses a sol-gel process resulting in a sol-gel hybrid material (equivalent of the crosslinkable chromophore with UV filter activity) (Scheme 1: page 1729, right column) is a crosslinkable monomer prepared by reacting a UV-A, UV-B, and/or UV-C chromophore such as a fluorinated benzophenone (equivalent of 'P' of the general formula  $M(R)_n(P)_m(Q)_q$  of the instant invention) with a aminoalkylalkoxysilane (APS) to give rise to a chromophoric xerogel such as 4-fluorobenzophenone:aminopropyltrimethoxysilane (APS) (equivalent of the chromophore monomer of Ex. 1: (triethoxysilyl)propyloxyphenyl-benzoxazole, and equivalent of the  $M(R)_n(P)_m(Q)_q$  where M is a silicon element, R is hydrolysable group such as an alkoxides [sic] and Q is a non-hydolyzable group such as an C1-C6 alkyl group as cited in paragraph 18-26 of the specification) (page 1730, Table 1; page 1729, right column, first paragraph)." (Id. at 3.)

Regarding claim 5, the Examiner asserted that "Spange et al. discloses a sol-gel chromophore hybrid containing a chromophore with UV-A and/or UV-B filter activity such as fluorobenzophenone (page 1729, right column, first paragraph). The spacer group  $(B)_b(C)_c(D)_d(E)_e$  is optional because b, c, d, and e could be 0 or 1. (Id.)

Regarding claim 8, the Examiner asserted that "Spange et al. discloses a sol-gel chromophore hybrid containing a silane with at least two C<sub>1-6</sub> alkoxy groups (fluorobenzophenone:aminopropyltrimethoxysilane) (page 1730, Table 1)." (Id. at 4.)

Regarding claim 9, the Examiner asserted that "Spange et al. discloses using a crosslinkable silane monomer in the process of sol-gel chromophore hybrid production, wherein the silane monomer is tetraethoxysilane (reads on at least two C<sub>1-6</sub> alkoxy groups of the instant claim) (page 1729, left column, third paragraph)." (Id.)

Regarding claim 10, the Examiner asserted that "Spange et al. discloses that when chromophoric substances such as 4-nitroaniline derivatives are incorporated into the silicate matrix, uniformly spherical particles with a narrow size-distribution of less than 2µm in diameter are formed (page 1729, right column, second paragraph; page 1731: figure 2)." (Id.)

Regarding claim 11, the Examiner asserted that "Spange discloses [that] the sol-gel materials prepared using this method contains up to 20% organofunctionalized silane (chromophoric silane) (pg. 1729, right column, second paragraph)." (Id.)

For the reasons set forth below, the rejection is respectfully traversed.

As is well settled, anticipation requires "identity of invention." *Glaverbel Societe Anonyme v. Northlake Mktg. & Supply*, 33 USPQ2d 1496, 1498 (Fed. Cir. 1995). Each and every element recited in a claim must be found in a single prior art reference and arranged as in the claim. *In re Marshall*, 198 USPQ 344, 346 (CCPA 1978); *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Co.* 221 USPQ 481, 485 (Fed. Cir 1984).

To forward prosecution in the present application, claim 13 has been amended to recite “[a] sunscreen composition comprising microcapsules having UV filter activity made by a sol-gel method and which are free from non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity, wherein at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity and at least one type of crosslinkable monomer which does not have UV-A and/or UV-B and/or UV-C filter activity are subjected to a crosslinking reaction in the absence of non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity, wherein at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity is a monomer of the formula  $M(R)_n(P)_m(Q)_q$ , wherein M is a metallic or semi-metallic element, R is a hydrolysable group, P is a chromophore with UV-A, UV-B and/or UV-C filter activity, Q is a non-hydrolysable group, n is 2 or 3, m is 1 or 2 and q is 0 or 1, wherein  $n+m+q=4$ .” And, claims 1-12 and 14-25 have been canceled without prejudice and claims 26-32 have been added.

It is noted that claim 13 was not rejected. All of the rejected claims have been canceled without prejudice. The rejection should be withdrawn for these reasons alone.

It is further noted that Spange does not disclose sunscreen compositions. (The Examiner has acknowledged this in the 35 USC § 103 rejection citing Spange in view of another document, Paper No. 20100203 at 7, lines 1-3.) Thus, Spange does not disclose each and every element of the claimed sunscreen composition of amended claim 13. It is submitted that the rejection is moot.

Reconsideration and withdrawal of the rejection is requested.

B. Avnir

Claims 1-10 and 12-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Avnir et al., U.S. Patent No. 6,159,453 ("Avnir"). (Paper No. 20100203 at 4.)

Avnir discloses "sunscreen-doped sol-gel materials useful for protecting body tissues, such as skin, nails and hair and other surfaces from sunlight radiation. The sol-gel matrices are transparent to the UV radiation in the range above 250 nm and the doped sunscreen agents are either chemical or physical sunscreens capable of absorbing the UV radiation in the range above 250 nm. Any sunscreen molecule, moiety or particle may be used...." (Abstract, lines 1-7.) Avnir also discloses "a method for the preparation of sunscreen-doped sol-gel materials comprising condensation-polymerizing of at least one monomer selected from metal alkoxides, semi metal alkoxides, metal esters, semi metal esters and from monomers of the formula  $M(R)_n(P)_m$ , wherein M is a metallic or semi metallic element, R is a hydrolyzable substituent, n is an integer from 2 to 6, P is a non polymerizable substituent or a sun screening moiety or derivative and m is an integer from 0 to 6, in the presence of at least one sunscreen ingredient, resulting in the entrapment of the sunscreen ingredients within the formed sol-gel matrix." (Abstract, lines 12-23.) Avnir further discloses that "[t]he preparation of sunscreen-doped sol gel matrices is simple; direct physical entrapment in the course of sol-gel polymerization is possible and no reaction with the sunscreen molecule itself is needed." (Col. 4, lines 31-34.) Avnir discloses the possibility of a sunscreen moiety or a group having another use as a substituent on the polymer of the matrix. (Col. 5, lines 22 to 38.)

In making the rejection with regard to claims 1-5 and 12, the Examiner asserted that "Avnir et al. discloses a method of preparing a sol-gel material with trapped sunscreen comprising condensation-polymerization of at least one monomer selected from metal alkoxides and from monomers of the formula  $M(R)_n(P)_m$ , wherein M is a metallic or semi metallic element (such as silicon, titanium, zinc, aluminum, zirconium) R is a hydrolyzable substituent (such as alkoxides, aryloxides, carboxylic esters, acyloxy groups, diketonato groups, hydrolyzable aza groups and chlorine), n is an integer from 2 to 6, P is a non polymerizable substituent (reads on the crosslinkable monomer of the instant invention) or a sun screening moiety or derivative (reads on the crosslinkable chromophore monomer of the instant invention) and m is an integer from 0 to 6, in the presence of at least one sunscreen ingredient, resulting in the entrapment of the sunscreen ingredients within the formed sol-gel matrix (col. 3, lines 33-46)." (Paper No. 20100203 at 4-5.)

Regarding claims 6, 7, 9, and 13, the Examiner asserted that "Avnir teaches using a combination of tri- and tetra-alkoxysilane monomers (col. 4, lines 48-51; col. 5, lines 44-48) in the presence of basic or acidic catalysts for entrapping sunscreen agents such as cinnamate, salicylate, and benzophenone (col. 6, lines 8-27), as well as surfactants (col. 5, lines 51-67)." (Id. at 5.)

Regarding claim 8, the Examiner asserted that "Avnir et al. teaches chromophoric monomers of the formula  $M(R)_n(P)_m$ , with R being a hydrolysable group such as an alkoxides [sic] group and n is an integer from 2-6 (col. 3, lines 33-46) (reads on at least two  $C_{1-6}$  alkoxy groups of the instant claim)." (Id.)

Regarding claim 10, the Examiner asserted that "Avnir et al. discloses the sol-gel matrices are particles in the range of 0.01-1 00 microns in diameter (col. 3, [lines 8-31])." (Id.)

As noted above, it is well settled that anticipation requires "identity of invention." *Glaverbel Societe Anonyme*, 33 USPQ2d at 1498. Each and every element recited in a claim must be found in a single prior art reference and arranged as in the claim. *In re Marshall*, 198 USPQ at 346; *Lindemann Maschinenfabrik GMBH.*, 221 USPQ at 485.

To forward prosecution in the present application, the claims have been amended as noted above. Accordingly, with respect to the cancelled claims, the rejection has been rendered moot and should be withdrawn.

With respect to the currently pending claims, which are under examination, we submit that Avnir fails to disclose each and every element of the sunscreen composition of amended claim 13. The sol-gel materials of Avnir are doped with sunscreen agents and the sunscreen agents are entrapped within the sol-gel matrices. (Col. 4, lines 20 to 37). Avnir discloses "direct physical entrapment in the course of sol-gel polymerization" and that "no reaction with the sunscreen molecule itself is needed." (Col. 4, lines 31-34.) Although Avnir discloses the possibility of a sunscreen moiety as a substituent on the polymer of the matrix (col. 5, lines 22 to 38), Avnir discloses in any event doping the sol-gel materials with monomeric non-crosslinkable sunscreen molecules to entrap them in the sol-gel matrices. (See, e.g., Abstract.)

Avnir does not disclose a sunscreen composition comprising microcapsules having UV filter activity made by a sol-gel method and which are **free from non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity**, as currently claimed. And, Avnir does not disclose that at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity and at least one type of crosslinkable monomer which does not have UV-A and/or UV-B and/or UV-C filter activity are subjected to a crosslinking reaction *in the absence of non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity*, as currently claimed. For at least these reasons, it is submitted that the rejection has been rendered moot.

Reconsideration and withdrawal of the rejection are requested.

C. Sakuta

Claims 1, 2, 4-9, and 11-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Sakuta et al., U.S. Patent No. 5,254,542. (Paper No. 20100203 at 5.)

Sakuta discloses organic silicon compounds having [a UV absorbing] benzotriazole or benzophenone skeleton...." (Col. 2, lines 31-33; Abstract, lines 1-2.) The compounds "are capable of readily forming tack-free, crack-free, even films. When blended in cosmetic compositions, the compounds are well dispersible, and spreadable and give pleasant feel on use." (Col. 3, lines 46-50.)

In making the rejection, the Examiner asserted that "Sakuta et al. discloses a method of preparing an organic silicon compound having a skeleton of UV absorbing agents such as benzotriazole or benzophenone (col. 3, lines 44-50; col. 1,

lines 65-67) comprising the steps of converting the UV absorbers to allyl derivatives (col. 2, lines 17-29); adding hydrosilane compounds with alkoxy group (results in an equivalent of the crosslinkable chromophore monomers of the instant invention) (col. 9, lines 21-40); and finally subjecting the reaction product to a hydrolysis reaction with an alkoxysilane such as trimethoxysilane (reads on the crosslinkable monomer of the instant invention) (col. 9, lines 60-64; col. 11, lines 13-18), wherein the UV absorber makes up from 1 to 33 mol% of the total moles of the organic group (col. 4, lines 19-26)." (Paper No. 20100203 at 5-6.)

As noted above, it is well settled that anticipation requires "identity of invention." *Glaverbel Societe Anonyme*, 33 USPQ2d at 1498. Each and every element recited in a claim must be found in a single prior art reference and arranged as in the claim. *In re Marshall*, 198 USPQ at 346; *Lindemann Maschinenfabrik GMBH.*, 221 USPQ at 485.

To forward prosecution, the claims have been amended as noted above. Accordingly, with respect to the cancelled claims, the rejection has been rendered moot and should be withdrawn.

With respect to the currently pending claims, which are under examination, we submit that Sakuta does not disclose each and every element of amended claim 13. The organic silicon compounds having a UV absorbing benzotriazole or benzophenone skeleton of Sakuta are not the same as and are not comparable to the claimed sunscreen composition comprising microcapsules made by a sol gel method. The compounds of Sakuta in cosmetic compositions are molecules that distribute evenly on a molecular level (Col. 3, lines 44-52), rather than in the form

of discrete particles (microcapsules) as presently claimed. Sakuta does not disclose microcapsules, let alone microcapsules having UV filter activity made by a sol-gel method.

Also, the compounds disclosed in Sakuta are not crosslinked. There is no disclosure in Sakuta of at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity and at least one type of crosslinkable monomer which does not have UV-A and/or UV-B and/or UV-C filter activity being subjected to a crosslinking reaction in the absence of non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity, as presently claimed.

For at least the foregoing reasons, the anticipation rejection has been rendered moot. Reconsideration and withdrawal of the rejection are requested.

### ***Obviousness Rejection***

Claim 9 was rejected under 35 U.S.C. § 103(a) as being obvious over Spange in view of Avnir. (Paper No. 20100203 at 6.)

Spange and Avnir are each summarized above.

In making the rejection, the Examiner asserted that "Spange remains as applied to claims 1-12 above. [Although] Spange teaches a method of encapsulating chromophores with an improved sol-gel process, [it] fails to teach its product used in a sunscreen composition. However, Avnir et al. teaches a method of entrapping chromophore derivatives in a sol-gel composition wherein the product is utilized as a sunscreen composition (col. 3, lines 15-17). Avnir et al. teaches that due to the carcinogenic nature of chemical sunscreens, it is essential to isolate the chemical

sunscreen agents from the body while retaining the sunscreen ability to absorb light (col. 1, lines 65 – col. 2, lines 1-5). Avnir et al. teaches that its sol-gel matrices are transparent to the UV radiation and thus allow light to reach the UV absorbing chromophores (col. 3, lines 18-22), while isolating the chromophores from skin, preventing its absorption and thus protecting the skin." (Id. at 7.)

The Examiner concluded that "it would have been obvious to one of ordinary skill in the art to apply a UV absorbing agent as a sunscreen agent as taught by Avnir et al. to the transparent sol-gel matrix of Spange et al. in order to entrap and isolate the sunscreen agent from the body." (Id.)

Initially, it is submitted that the rejection is unclear regarding the claims to which it applies, and that the rejection should be removed for this reason alone. The Examiner listed only claim 9 in the rejection, yet the rejection uses the plural verb "are" in asserting that "Claim 9 are rejected...." (Id. at 6.) Also, the content of the rejection, summarized above, addresses "a sunscreen composition" (Id. at 7), which is the subject matter of claim 13 and not claim 9. Although the Examiner has not stated that the rejection applies to claim 13, to forward prosecution in this application, the rejection is addressed here as to presently amended claim 13.

To forward prosecution in the present application, the claims have been amended as noted above.

It is well settled the Examiner bears the burden to set forth a *prima facie* case of unpatentability. *In re Glaug*, 62 USPQ2d 1151, 1152 (Fed. Cir. 2002); *In re Oetiker*, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); and *In re Piasecki*, 223 USPQ 785,

788 (Fed. Cir. 1984). If the PTO fails to meet its burden, then the applicant is entitled to a patent. *In re Glaug*, 62 USPQ2d at 1152.

When patentability turns on the question of obviousness, as here, the search for and analysis of the prior art by the PTO should include evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and modify the document(s) relied on by the Examiner as evidence of obviousness. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731-32 (2007) (the obviousness "**analysis should be made explicit**" and the teaching-suggestion-motivation test is "**a helpful insight**" for determining obviousness) (emphasis added); *McGinley v. Franklin Sports*, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001). Moreover, the factual inquiry whether to modify document(s) must be thorough and searching. And, as is well settled, the teaching, motivation, or suggestion test "**must be based on objective evidence of record.**" *In re Lee*, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002) (emphasis added). See also *Examination Guidelines for Determining Obviousness*, 72 Fed. Reg. 57526, 57528 (October 10, 2007) ("The key to supporting any rejection under 35 USC § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious.").

Here, what the rejection should have done, but did not, was to explain on the record **why** one skilled in this art would modify Spange or Avnir in the manner proposed by the Examiner to arrive at the claimed sunscreen composition. As is well settled, an Examiner cannot establish obviousness by locating documents which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the

patent applicant has done. *Takeda Chem. Indus., Ltd v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1357 (Fed. Cir. 2007) (citing *KSR*) (indicating that "it remains necessary to identify **some reason** that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound") (emphasis added); *Ex parte Levengood*, 28 USPQ2d 1300, 1301-02 (BPAI 1993). But this is precisely what the Examiner has done here. Thus, the rejection is legally deficient and should be withdrawn for this reason alone.

Beyond looking at the cited documents to determine if any of them suggests doing what the present inventor has done, one must also consider if the art provides the required expectation of succeeding in that endeavor. See *In re Dow Chem. Co. v. American Cyanamid Co.*, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). "Obviousness does not require absolute predictability, but a reasonable expectation of success is necessary." *In re Clinton*, 188 USPQ 365, 367 (CCPA 1976). Furthermore, the *U.S. Patent and Trademark Office Examination Guidelines* at page 57527 provide the following guidance to Examiners: "In short, the focus when making a determination of obviousness should be on what a person of ordinary skill in the pertinent art would have known at the time of the invention, and on what such a person would have reasonably expected to have been able to do in view of that knowledge." However, no such motivation or expectation of success can be found in the cited documents.

Spange provides no suggestion, motivation for, or expectation of success in the claimed sunscreen composition. As the Examiner has acknowledged, Spange does not disclose sunscreen compositions. (Paper No. 20100203 at 7.) Spange discloses a one-pot synthesis of chromophoric silicate-based xerogels for use in areas

such as non-linear optical materials, semi-conductors, and in sensors (Title and first paragraph). These technical fields are unrelated to the field of cosmetic compositions. A skilled person with respect to the claimed invention is likely to be a formulations scientist who develops cosmetic sunscreen formulations in the cosmetics industry. A formulations scientist in the cosmetic industry would not have expected to garner any helpful advice for solving problems which occur in formulating sunscreen compositions from documents that relate to materials for use in nonlinear-optical materials, semiconductors, sensors, etc.

In developing a sunscreen composition, one of ordinary skill in the art would generally consider formulating with UV-filters which have good UV-filter activity and which are easily accessible and compatible with the other typically used ingredients of cosmetic and dermatological compositions. (Specification, page 3, third paragraph, lines 2-4.). Yet Spange is not concerned at all with the application of sunscreen agents to human skin or protecting human skin from sun. A skilled person had no reason to consider the disclosure of this document being relevant to solving problems which occur in cosmetic compositions containing sunscreen agents.

As disclosed in the specification of the present application, problems to be solved regarding the claimed invention relate to cosmetic formulations. In formulating sunscreen compositions there is a risk that monomeric UV filtering compounds can penetrate the skin, which is undesirable. (Specification, Page 1, lines 15-17.) Also, monomeric chromophores can react with other components of the formulations, which can lead to a deterioration of the sunscreen activity of the chromophores over time. (Specification, page 1, lines 23-26.) Furthermore, the compositions should not contain

compounds that can lead to skin irritation. Spange in no way addresses such issues or problems.

Avnir fails to fill the deficiencies of Spange. Avnir discloses a method of entrapping chromophore derivatives in a sol-gel composition and use of the sunscreen-doped sol-gel materials as sunscreens. (Abstract, lines 12-23.; Col. 3, lines 15 to 17). Avnir recognizes that that chemical sunscreens may be carcinogenic (Col. 1, line 66 to Col. 2, line 1) and the "great need for isolating chemical ... sunscreen agents from the body while retaining ... the sunscreen activity...." (Col. 1, line 65 to col. 2, line 5). In connection with Avnir's disclosed sunscreen-doped sol-gel materials, Avnir discloses that "[t]he entrapped sunscreen molecules are not in direct contact with the skin." (Col. 4, lines 53-55.)

Avnir discloses a sol-gel matrix which is transparent to the UV range above 250 nm, which is prepared by a sol-gel process. The sol-gel particles are doped with sunscreen molecules to provide sunscreen-doped sol-gel matrices. (Col. 4, lines 20-37.) The sunscreen molecules of Avnir are entrapped within the sol-gel matrix and they are not covalently bonded to the matrix. (Col. 4, lines 20-37.) Avnir discloses that "[t]he preparation of sunscreen-doped sol-gel matrices is simple; direct physical entrapment in the course of the sol-gel polymerization is possible and no reaction with the sunscreen molecule itself is needed." (Col. 4, lines 31-34.) Avnir discloses and considers only that the sol-gel matrix particles are doped with a sunscreen agent which is not covalently bonded to the matrix material. The sunscreen-doped sol-gel matrices of Avnir are prepared by forming the sol-gel matrix in the presence of chromophores that do not crosslink with the sol-gel material. Because according to Avnir, "[t]he

entrapped sunscreen molecules are not in direct contact with the skin" (col. 4, lines 53-54), Avnir indicates that the disclosed sunscreen-doped sol-gel materials meet the purported advantage of "isolating chemical and physical sunscreen agents from the body...." (Col. 2, lines 12-14.)

Avnir fails to suggest, provide motivation for, or an expectation of success in the claimed sunscreen compositions comprising microcapsules having UV filter activity made by a sol-gel method and which are ***free from non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity***, wherein at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity and at least one type of crosslinkable monomer which does not have UV-A and/or UV-B and/or UV-C filter activity are ***subjected to a crosslinking reaction in the absence of non-crosslinkable chromophores with UV-A and/or UV-B and/or UV-C filter activity***, wherein at least one type of crosslinkable chromophore with UV-A and/or UV-B and/or UV-C filter activity is a monomer of the formula  $M(R)_n(P)_m(Q)_q$ , wherein M is a metallic or semi-metallic element, R is a hydrolysable group, P is a chromophore with UV-A, UV-B and/or UV-C filter activity, Q is a non-hydrolysable group, n is 2 or 3, m is 1 or 2 and q is 0 or 1, wherein  $n+m+q=4$ . Avnir does not disclose or suggest crosslinking in the absence of non-crosslinkable sunscreens. Furthermore, the sunscreen-doped sol-gel matrices of Avnir teach away from the claimed sunscreen composition having microcapsules that do not have non-crosslinkable sunscreen molecules that are "trapped" within the polymer matrix of the sol-gel particles.

As indicated in the specification, a problem encountered in formulating sunscreen agents as cosmetic formulations for the protection of the skin against the

harmful effects of sunlight is that several types of sunscreen molecules are typically used which are often not compatible with each other. This can lead to a deactivation of the sunscreen molecules and a decrease of the activity of the sunscreen agents (Paragraph bridging pages 1 and 2). A further problem is the risk that sunscreen molecules which are monomeric compounds will penetrate the skin barrier, which is highly undesirable. (Page 1, fourth paragraph.)

Sol-gel materials known in the art are addressed in the introductory part of the present application (specification, page 1, last paragraph to page 3, second paragraph). In particular, WO 98/31333, which corresponds to the cited Avnir U.S. patent, is discussed in the paragraph bridging pages 2 and 3. As is known in the art, microcapsules can be prepared by a sol-gel process and those microcapsules are said to permanently encapsulate monomeric sunscreen molecules. (Specification, page 2, lines 3-4.) Although Avnir discloses that the entrapped monomeric sunscreen molecules do not leach from the matrix into the cosmetic vehicle (col. 5, lines 1-2), in practice a leakage cannot be completely prohibited. (Specification, page 2, third paragraph.)

In addition, even if the monomeric sunscreen molecules entrapped in the sol-gel matrix of Avnir would not leach out to the cosmetic vehicle, it is possible that a different type of monomeric sunscreen molecule or other component included in the sunscreen composition could leach into the sol-gel microcapsules. Those sunscreen molecules or other components that potentially leach in can react with the entrapped monomeric sunscreen molecules, leading to a decrease in sunscreen activity over time. The sunscreen-doped sol-gel materials of Avnir are tightly entrapped particles which

can reduce the interaction between different UV filters, but as the specification discloses, "this only slows down the inactivation of the UV filters but does not sufficiently prevent it." (Specification, page 2, third paragraph). Avnir does not acknowledge this problem and provides no motivation to address this issue.

One skilled in the art would not find any suggestion, motivation for, or expectation of success in Avnir regarding the claimed sunscreen compositions comprising microcapsules prepared by the sol-gel method which are free of monomeric non-crosslinkable sunscreen molecules, and which provide a sufficiently high SPF value to be useful as cosmetic sunscreen formulations. While Avnir mentions as a possibility a sunscreen moiety as a substituent on the polymer of the matrix (col. 5, lines 22 to 38), no examples of such substituents are provided, no process for preparing a sol-gel matrix polymerized with such a substituent is provided, and no example of such an embodiment is given. Because Avnir discloses and suggests in any event doping the sol-gel materials with monomeric non-crosslinkable sunscreen molecules (see, e.g., Abstract), one skilled in the art would have understood Avnir to indicate that a sunscreen moiety covalently bonded to the matrix of the sol-gel particle would not have been sufficient to provide a reasonable sun protection factor or to be otherwise useful in a cosmetic sunscreen composition without the necessary monomeric non-crosslinkable chromophores.

And according to Avnir, it is necessary to dope the particles of the sol-gel materials with monomeric non-crosslinkable sunscreen molecules and yet the doped monomeric molecules would not, according to Avnir, leak and come into contact with skin. Far from suggesting the claimed invention, Avnir leads one skilled in the art away

from the claimed invention because Avnir considers it essential that the sol-gel process is carried out in the presence of non-crosslinkable chromophores in order to obtain a sol-gel matrix material providing a sufficient sun protection factor or otherwise sufficiently useful as cosmetic sunscreen compositions. As is well settled, doing what an asserted document teaches against is the antithesis of obviousness. See, e.g., *In re Buehler*, 515 F.2d 1134 (CCPA 1975) and *In re Rosenberger*, 386 F.2d 1015 (CCPA 1967).

In accordance with the claimed invention, it has been found that contrary to the disclosure of Avnir (which one skilled in the art would understand to suggest that doping with monomeric sunscreen molecules is necessary to obtain suitable sunscreen protection), it is not necessary to dope particles of a sol-gel matrix with monomeric sunscreen molecules. It has been unexpectedly found that the claimed microcapsules can be prepared using the sol-gel process while not including non-crosslinkable monomeric sunscreen molecules but only sunscreen molecules which covalently bond to the polymeric matrix of the microcapsules. Irrespective of the expectations of one skilled in the art, the claimed microcapsules prepared by the sol-gel process with crosslinkable chromophores in the absence of any non-crosslinkable chromophores have a sufficient sun-protecting factor. The claimed sunscreen compositions comprising the recited microcapsules have a very high UV-filter activity and provide an excellent SPF factor of a cosmetic agent. (e.g., Specification, Example 6.)

It is respectfully submitted that the Examiner's combination of Spange and Avnir is improper. While Avnir discloses that sol-gel materials which are doped with monomeric non-crosslinkable sunscreen molecules can be used in cosmetic

formulations and that the resulting microcapsules do not leak the monomeric sunscreen molecules, this disclosure of Avnir pertains to sol-gel materials with entrapped (non-covalently bonded) monomeric sunscreen molecules which are not present in or suggested by the disclosed xerogels of Spange.

A skilled person, even if he or she had considered the teachings of Spange in view of the teaching of Avnir, would not have expected that the chromophoric silicate-based xerogels could be used in cosmetic sunscreen compositions in a manner that addresses the problems as solved by the claimed invention. Rather, from Avnir, it follows that the art considered the xerogels as disclosed in Spange, which contain chromophores covalently bonded to a polymer network, as not being sufficient to provide adequate sun protection to skin. Avnir considers it necessary that the sol-gel materials be doped with monomeric chromophoric molecules in order to provide a suitable sun protection for skin. In view of the fact that Spange discloses a process for producing chromophoric silicate-based xerogels for uses which are not even remotely related to cosmetic sunscreen formulations and that one skilled in the art would understand Avnir to suggest that a sol-gel material without entrapped monomeric sunscreen compounds would not provide sufficient sunscreen activity, one skilled in the art would not have derived motivation or expectation of success in the claimed sunscreen compositions which provide an excellent light protecting factor in cosmetic sunscreen compositions comprising microcapsules free from non-crosslinkable sunscreen compounds.

A skilled person who theoretically may have considered Spange in view of Avnir (although we maintain that no one skilled in the art would do so) might have used

the process to produce xerogels as disclosed in Spange; he would have done so, however, including non-crosslinkable chromophoric molecules in that process as required by Avnir to entrap those molecules in the xerogel. The skilled person had no reason to expect that without such entrapped chromophoric molecules advantageous microcapsules for use in cosmetic sunscreen compositions which provide an excellent SPF could be obtained.

It follows that even if a skilled person would have considered the disclosure of Spange at all (which is contested), the Examiner could not make the present rejection without impermissible hindsight. Without the disclosure of the present application, a skilled person had no reason to modify both Spange and Avnir or to expect that from the disclosure of Spange and/or Avnir that the claimed sunscreen compositions comprising the recited microcapsules could advantageously be achieved for use in cosmetic sunscreen formulations to provide an excellent SPF.

Workers in the field may have considered possible alternative ways to formulate sunscreen compositions comprising microcapsules having UV filter activity in which sunscreen compounds which provide UV filter activity do not leak, yet achieving such compositions as the claimed sunscreen compositions would not have been predictable to one of skill in the art. Here, known options were not "finite, identified, and predictable," as in the facts presented in *KSR Int. Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). Moreover, in *Abbott Labs. v. Sandoz, Inc.*, 89 USPQ 1161, 1171 (Fed. Cir. 2008), the Court of Appeals for the Federal Circuit indicated that the Supreme Court in KSR "did not create a presumption that all experimentation in fields where there is

already a background of useful knowledge is ‘obvious to try,’ without considering the nature of the science or technology.”

The Court of Appeals for the Federal Circuit has reaffirmed that “hindsight claims of obviousness” are improper. In distinguishing between fact patterns where a combination of known elements may or may not be proper, the Federal Circuit clearly articulated that simply varying all possible parameters until the claimed invention is arrived at in the absence of either an indication of which parameters to vary or an indication of which of many possible choices is likely to be successful is impermissible hindsight reconstruction. Indeed, the Federal Circuit concluded:

Similarly, patents are not barred just because it was obvious “to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it.” *Procter & Gamble Co. v. Teva Pharmaceuticals USA, Inc.*, 90 USPQ2d 1947, 1951 (Fed. Cir. 2009), citing *In re O’Farrell*, 853 F.2d at 903.

As in the *Abbott* case, one skilled in the art would not have anticipated success in achieving the presently claimed sunscreen compositions comprising microcapsules having good UV filter activity yet not having entrapped non-crosslinkable sunscreen molecules, as “knowledge of the goal does not render its achievement obvious.” *Abbott Labs. v. Sandoz, Inc.*, 89 USPQ at 1172 (affirming the district court’s determination that Abbott is likely to prevail in its claim that the patent is valid, and upholding the grant of a preliminary injunction).

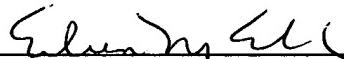
Clearly, the Examiner’s rejection is based on impermissible hindsight reconstruction and is improper. It is submitted that the rejection has been rendered moot. Reconsideration and withdrawal of the rejection are requested.

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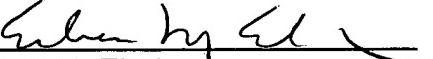
For the reasons set forth above, entry of the amendments, withdrawal of the rejections and allowance of the claims are respectfully requested. Issuance of a Notice of Allowance is respectfully requested. If the Examiner has any questions regarding this paper, please contact the undersigned.

Respectfully submitted,

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 19, 2010.



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